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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/510,479	10/07/2004	Seitaro Matsuo	T0203.0008/P0008	7443

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EXAMINER

DHINGRA, RAKESH KUMAR

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 07/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/510,479	MATSUO ET AL.	
	Examiner	Art Unit	
	Rakesh K. Dhingra	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 October 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 October 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>10/04, 12/04</u> | 6) <input type="checkbox"/> Other: _____ |

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshiki et al (US Patent No. 5,843,236) in view of Shinji et al (JP 62-152127).

Regarding Claim 1: Yoshiki et al teach a plasma apparatus (Figures 1, 2, 8) comprising: a plasma generation chamber 7 with an opening, magnetic coils 10, waveguide (microwave introducing means) 18 with termination 19 at its end and with plurality of slots 80. Yoshiki et al also teach that by shifting the position of long slots 18b and 18c the phase of electric fields of microwaves can be controlled (column 15, line 10 to column 17, line 40).

Yoshiki et al do not teach rectangular shape of plasma generating chamber, its opening and magnetic coils.

Shinji et al teach an apparatus (Figures 1, 2) that includes a rectangular plasma chamber 1 having a rectangular outlet 1d and rectangular shaped magnetic coil 4 (Abstract).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use rectangular shaped plasma chamber with rectangular opening and rectangular shaped magnetic coil as taught by Shinji et al in the apparatus of Yoshiki et al enable process a rectangular specimen uniformly.

Claim 2, 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshiki et al (US Patent No. 5,843,236) in view of Shinji et al (JP 62-152127) as applied to Claim 1 and further in view of Hiroshi et al (US Patent No. 5,389,154).

Regarding Claims 2,3: Yoshiki et al in view of Shinji et al teach all limitations of the claim except that microwave introducing means includes microwave branching means.

Hiroshi et al teach an ECR plasma apparatus (Figure 1) comprising:

a plasma generation chamber 20, magnetic coils 50, waveguide (microwave introducing means) 33 that includes dividing circuit (branching means) 64 (column 6, lines 40-60).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use microwave introducing means that includes branching and binding means as taught by Hiroshi et al in the apparatus of Yoshiki et al in view of Shinji et al to enable control formation of node and the phase of the magnetic fields of microwaves (column 7, lines 15-50).

Claims 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshiki et al (US Patent No. 5,843,236) in view of Shinji et al (JP 62-152127) and Hiroshi et al (US Patent No. 5,389,154) as applied to Claim 3 and further in view of Chouan et al (US patent No. 5,328,515).

Regarding Claims 4, 6: Yoshiki et al in view of Shinji et al and Hiroshi et al teach all limitations of the claim except sample moving means.

Chouan et al teach a plasma apparatus (Figure 1) comprising:

a rectangular plasma generation chamber 6 with a rectangular opening 14 and a treatment enclosure 16 which houses movable sample holder 18 such that rectangular area of sample is irradiated (column 5, lines 5-50).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use a movable sample holder as taught by Chouan et al in the apparatus of Yoshiki et al in view of Shinji et al and Hiroshi et al to achieve homogeneous deposition/etching of large area work samples (column 2, lines 15-20).

Regarding Claim 5: Hiroshi et al teach that apparatus is an ECR plasma apparatus.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshiki et al (US Patent No. 5,843,236) in view of Shinji et al (JP 62-152127) and Kou et al (US Patent No. 6,246,75).

Regarding Claim 7: Yoshiki et al in view of Shinji et al teach all limitations of the claim as explained above except microwave introduction means include resonant cavity with first and second openings.

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Kou et al teach a plasma apparatus (Figures 1, 2, 5, 6) comprising a processing chamber 60 and a microwave introduction means having a cavity resonator 100 with a first opening 12 at one end and plurality of second openings (to locate windows 64). Kou et al also teach that distance between a terminal end of the cavity and the other end having first opening 12 is a design parameter and is set such that resonant condition is maintained in the cavity. Kou et al further teach that distance between a terminal end of the cavity and the end having first opening is: $49 \times 11 = 539$ mm or 53.9 cm, which includes the range given in the claim formula (that is, $\lambda_{\text{sub.g}} / 2 \times n$, where n is 3 or more and $\lambda_{\text{sub.g}}$ is approx. 12.24 cm for frequency of 2.45 GHz). It would be obvious to optimize the above referred distance as per related process parameters (column 3, line 10 to column 6, line 50).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use microwave cavity resonator as taught by Kou et al in the apparatus of Yoshiki et al in view of Shinji et al to achieve high electric field density for processing large area substrates (column 2, lines 20-35).

Claims 8, 9, 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshiki et al (US Patent No. 5,843,236) in view of Shinji et al (JP 62-152127) and Kou et al (US Patent No. 6,246,75) as applied to Claim 7 and further in view of Hiroshi et al (US Patent No. 5,389,154).

Regarding Claim 8: Yoshiki et al in view of Shinji et al and Kou et al teach all limitations of the claim except that microwave introducing means includes microwave branching means.

Hiroshi et al teach an ECR plasma apparatus (Figure 1) comprising:

a plasma generation chamber 20, magnetic coils 50, waveguide (microwave introducing means) 33 that includes dividing circuit (branching means) 64 (column 6, lines 40-60).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use microwave introducing means which include branching and binding means as taught by Hiroshi et al in the apparatus of Yoshiki et al in view of Shinji et al and Kou et al to enable control formation of node and the phase of the magnetic fields of microwaves (column 7, lines 15-50).

Regarding Claims 9, 11: Hiroshi et al teach that apparatus is an ECR plasma apparatus.

Claims 10, 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshiki et al (US Patent No. 5,843,236) in view of Shinji et al (JP 62-152127), Kou et al (US Patent No. 6,246,75) and Hiroshi et al (US Patent No. 5,389,154) as applied to Claim 9, 11 and further in view of Chouan et al (US patent No. 5,328,515).

Regarding Claims 10, 12: Yoshiki et al in view of Shinji et al, Kou et al and Hiroshi et al teach all limitations of the claim except sample moving means.

Chouan et al teach a plasma apparatus (Figure 1) comprising:

a rectangular plasma generation chamber 6 with a rectangular opening 14 and a treatment enclosure 16 which houses movable sample holder 18 such that rectangular area of sample is irradiated (column 5, lines 5-50).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use a movable sample holder as taught by Chouan et al in the apparatus of

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Yoshiki et al in view of Shinji et al, Kou et al and Hiroshi et al to achieve homogeneous deposition and etching of large area work samples (column 2, lines 15-20).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rakesh K. Dhingra whose telephone number is (571)-272-5959. The examiner can normally be reached on 8:30 -6:00 (Monday - Friday). If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571)-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Rakesh Dhingra



Parviz Hassanzadeh
Supervisory Patent Examiner
Art Unit 1763